



Space News Roundup

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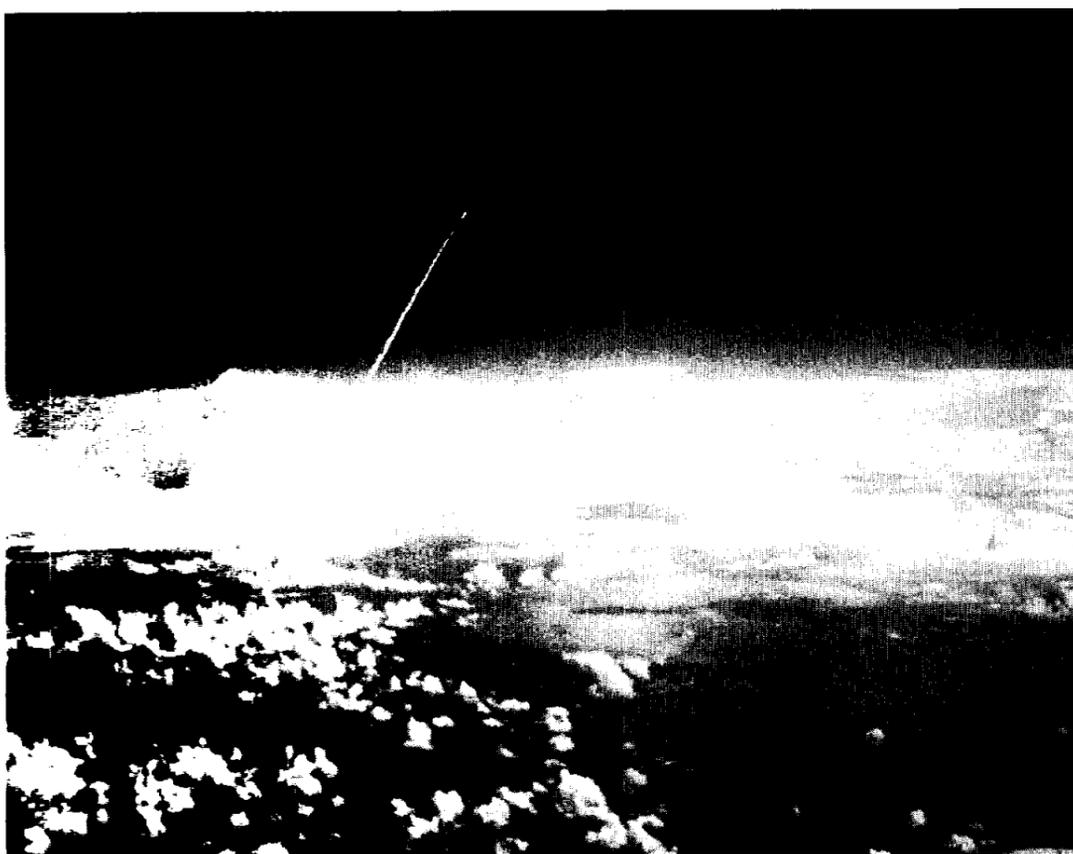


Photo by T. Haydee Laguna

This photograph of the STS-26 launch was taken by T. Haydee Laguna, an airline passenger bound for Paradise Island in the Bahamas. She sent the photo of what she called "the most beautiful sight this side of heaven" to NASA along with a congratulatory letter.

JSC mailbox always brimming

Correspondents answer millions of letters each year

By James Hartsfield

They come from people the world over, asking about the stars, asking about the Earth. They ask about nuts and bolts and rockets and atoms and magnets and so forth and so on and literally anything under the Sun.

They are often congratulations and thanks. They are drawings and photographs. They contain money. They contain wishes and dreams and hopes and heartwarming stories.

And then sometimes, the public writes letters for no reason at all.

NASA receives thousands of fan letters annually, bag upon bag of viewer mail from every state, every country. The vast majority of that mail comes to JSC. The center's main mail room processed more than 7 million pieces of mail last year, and a significant portion came from the general public.

Every day, the fan mail is sorted. Astronaut letters, averaging 6,500 a month, go to the astronaut mailroom. Letters to the director go to the Director's Office. But the biggest variety pack of letters, 2,500 a month asking for information on subjects ranging from Venus to Apollo, go to the Public Services Branch. Special requests, letters that are simply uncategorical, also are handled there.

Who are NASA's pen pals? Many of them are children, writing to astronauts or requesting information on various subjects. By its very nature, the agency is a magnet for people who dream about the future, who dream about the stars and, sometimes, for people who just dream.

There is no better evidence that NASA is seen as the free world's space program than JSC's daily

mail. Letters pour in constantly from every single country on Earth, including those behind the iron curtain. England, Australia, Canada, France, Belgium, Mexico and all of Latin America are large contributors to the seemingly infinite influx. Poland, Cuba and East Germany also are a source of many letters. Many may be addressed only to "NASA" or to "NASA, Houston," but they will find their way to JSC.

In part, the constant mail can be credited to NASA's fame, Doris Grosshauser, chief of JSC's Correspondence Section, said. "It's because they admire the space program so much," Grosshauser said. "It's everybody's dream."

NASA's position as a newsmaker is only part of the attraction, though. It is apparent in many of the letters that the public sees NASA as an

Please see **LETTERS**, Page 3

Orbital debris growing threat, study cautions

A six-month interagency study of orbital debris—co-chaired by NASA and the Department of Defense (DOD)—has concluded that, left unchecked, the growth of debris could threaten the safe and reliable operation of manned and unmanned spacecraft in the next century.

The study, released Feb. 17, reviews current policies and activities designed to reduce the amount of "space junk" or mitigate its effects and explores potential opportunities for further action. International efforts, legal issues and commercial regulations also are examined.

Joseph P. Loftus Jr., JSC's assistant director for plans, said scientists at JSC provided a great deal of the information used in the report. Space Science Branch Chief Drew Potter, scientists Don Kessler and Gene Stansbery, and Loftus were part of the interagency working group that prepared the study. Also participating were the U.S. Air Force and Navy Space Commands, the Department of Transportation (DOT), the Depart-

ment of State, Department of Commerce, and Federal Communications Commission, he said. The working group met twice at JSC.

"There is now widespread appreciation that this is a significant issue and that we need to manage our space activities in a way which protects the future environment," Loftus said. "As recently as three or four years ago that wasn't acknowledged. Now there's no doubt in anybody's mind."

Loftus said the interagency working group was established following publication of former President Ronald Reagan's national space policy in February 1988. He said a comparable study undertaken by the European Space Agency and released in December 1988 produced similar conclusions.

The report cites satellite and rocket body fragmentation as the principle source of orbital debris. But it recognizes that current knowledge of the orbital debris population is limited by

Please see **DEBRIS**, Page 4.

Launch preparations nearing home stretch

By Kyle Herring

Technicians at Kennedy Space Center this week began replacing heat shields around *Discovery's* main engine nozzles following final hook ups on three replacement high pressure oxidizer turbopumps. Final STS-29 launch preparations are expected to begin next week.

The launch of STS-29 from Kennedy's launch complex 39-B is targeted for about March 10. The final launch date will be announced following completion of the flight readiness review (FRR) at KSC next Friday.

Prior to the review, the Space Shuttle main engine program will complete verification of a new process for building up the oxidizer pumps. The process, used on the new *Discovery* turbopumps, prevents moisture that

could cause stress corrosion cracks inside the pumps. One such crack was found on a pump following the STS-27 mission last December.

"We will verify the new pump process" before the flight readiness review, said Carl Kotila, JSC Project Integration Office lead for main

engines. That new process includes longer heating time to dissipate any interior moisture prior to shipment from Rocketdyne.

Delivered and installed earlier than expected, the replacement pumps were checked out by Wednesday afternoon. The 24-hour helium signature leak test was scheduled to begin this evening or early tomorrow.

Also scheduled over the weekend is pressurization of the external tank and the two-part installation of ord-

Please see **STS-29**, Page 4



Cohen: Report your safety concerns

Dear fellow employees:

A series of recent newspaper stories contained allegations from anonymous sources that I and other NASA managers had bent the rules and showed favoritism in determining astronauts' medical qualifications for space flight.

Those allegations are categorically untrue. There has been no rule bending, there have been no special dispensations and there has been no favoritism in determining astronauts' medical qualifications for space flight.

Had those allegations involved spacecraft systems and hardware instead of human beings, we would have laid out the record, subjected our decisions to the full glare of public opinion and allowed them to stand on their merits. This is the course we routinely follow with our spacecraft

and our operations. It is an easier course than the one we must follow where employee medical records and the Privacy Act are involved.

The Privacy Act of 1974 provides both criminal and civil penalties for the unauthorized disclosure of personal information contained in NASA files. Medical records are a prime example of files that are protected from unauthorized disclosure, and the protection applies not only to astronaut medical records, but to the medical records of all NASA employees. Therefore, it was not a matter of choice that we refused to lay out the medical record in order to vindicate our decision processes, the law prohibits it.

The real issue, however, is not the privacy of individual medical records; it is flight safety. The public, including

every NASA employee, has the right to know that the agency's managers are making decisions that do not compromise safety. To this end NASA has established a stringent set of safeguards and channels through which employees and the public can elevate concerns and force knowledgeable, independent review of the management process.

Each of you has not only the right but the responsibility to call attention to situations that you feel might compromise flight safety. The reporting systems assure that legitimate concerns are reviewed and acted upon promptly and effectively, without violating the law or trampling the rights of others. The normal procedure for voicing concerns is through your supervisory chain. However, if the supervisory chain is not respon-

sive or if you feel a need for anonymity, the NASA Safety Reporting System and safety hotline or the NASA Investigator General hotline also are available.

It is essential that we remain uncompromising in our pursuit of safety. I encourage you to familiarize yourself with these safety reporting systems and use them to register any concern you may have.

NASA Safety Reporting System forms are available at strategic locations in most buildings. The NASA Safety Reporting System Hotline number is 483-7500. The NASA Inspector General Hotline is 483-4773, or toll free, 800-424-9183.

Aaron Cohen



NASA Safety Reporting System Hotline:

483-7500

NASA Inspector General Hotline:

483-4773

OR

800-424-9183

People

Blacknall AIAA woman of month

Carolyn Blacknall of Eagle Engineering, has been selected as February's Woman of the Month by the Houston chapter of the American Institute of Aeronautics and Astronautics (AIAA). She has been an AIAA member since 1978. Blacknall currently serves as secretary to the local AIAA section and is on that organization's International Space Activity Committee and Professional Woman's Committee.

Blacknall served in flight operations, systems engineering, payload integration and space station life sciences before joining Eagle. She received her



Blacknall

award at the AIAA dinner meeting at the Gilruth Recreation Center on Thursday.

Shea becomes visiting prof

Dr. Joseph F. Shea, former manager of the Apollo Spacecraft Program at JSC, has been named the 1989 Jerome C. Hunsaker Visiting Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology (MIT).

Shea, now senior vice president for engineering at Raytheon Co., received the distinction for research and public service in the field of aeronautics and astronautics.

As visiting professor, he will deliver the annual Minta Martin lecture at MIT and three other universities.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays:

FBA membership cards (available to civil service employees and retirees): free. Premium membership, (available until Feb. 27, includes Houston Gold C coupon book): \$4.

General Cinema (valid for one year): \$3.50 each.

AMC Theater (valid until May 31): \$2.95 each.

Sea World (San Antonio, year

long): adults, \$17.25; children \$14.75.

Revival (March 3,4,10,11,17, 8:15 p.m., League City Civic Center): \$5.

Pericles, Prince of Tyre (April 22-28, 8 p.m., Satellite Theatre, UHCL): \$4.

Delta Downs Trip (March 18, includes transportation, soft drinks, admission to clubhouse): \$16.

Delta Downs Overnight Trip (March 18-19, includes transportation, champagne welcome, admission, accommodations at Beaumont Hilton, Sunday brunch): \$50.

JSC

Dates & Data

Today

Cafeteria menu—Special: Salisbury steak. Entrees: fried shrimp, deviled crabs, ham steak. Soup: seafood gumbo. Vegetables: buttered carrots, green beans, June peas.

Monday

SEDS meeting—The University of Houston-Clear Lake (UHCL) chapter of Students for the Exploration and Development of Space will meet at 7:30 p.m. Feb. 27 in Rm. 2-504 of the UHCL Bayou Bldg. Peter Lange will present slides on "The Overview Effect—Space Exploration and Human Evolution," by Frank White. For more information, call Lange at x30850 or 334-2081.

Cafeteria menu—Special: hamburger steak. Entrees: beef burgundy over noodles, fried chicken, barbecue link. Soup: cream of chicken. Vegetables: buttered corn, carrots, green beans.

Tuesday

BAPCO meets—The next meeting of the Bay Area PC Organization (BAPCO) will be at 7:30 p.m. Feb. 28 at the League City Bank and Trust. For more information, call Earl Rubenstein, x34807, or Ron Waldbillig, 337-5074.

Technical papers—The Houston Chapter of the National Technical Association (NTA) is seeking innovative papers and abstracts on aerospace, computers, electronics, software engineering and related topics for presentation at the NTA annual Technical Symposium April 7-8 at the Doubletree Hotel-Allen Center. The symposium theme is "Technology: The Roots of Our Future." Deadline for submissions is April 28. Send a brief abstract and

biographical sketch, both 300 words or less, to Carrington H. Steward, VE3, or William Williams, EB2. For more information, call Donna Blackshear at x30574, or Rae Martel, x34160.

Cafeteria menu—Special: turkey and dressing. Entrees: baked meatloaf, liver and onions, barbecue spare ribs. Soup: beef noodle. Vegetables: Spanish rice, broccoli, buttered squash.

Wednesday

Cafeteria menu—Special: Spanish macaroni. Entrees: broiled fish, tamales with chili. Soup: seafood gumbo. Vegetables: ranch beans, beets, parsley potatoes.

Thursday

On-site blood drive—The first on-site JSC Blood Drive for 1989 will be 8 a.m.-4 p.m. March 2 at the Gilruth Recreation Center. All JSC employees and contractor employees are invited to participate. For appointments, call Bob Jones, x33004, or Mary O'Rear, x36531. For more information, call Helon Crawford, Blood Bank Committee chairman, x34159.

AIAA professional women meet—The AIAA Professional Women's Committee will meet at 5 p.m. March 2 in the second floor lounge of the Nassau Bay Hilton. For more information, call Carolyn Blacknall, 283-6000, or Walter Lueke, x35939.

Credit Union meeting—All members are invited to attend the JSC Federal Credit Union's annual meeting at 7 p.m. March 2 in the Credit Union lobby. Three directors will be elected for three-year terms. Members may vote for directors at the Credit Union during regular business

hours as well as prior to the meeting. Each primary member is entitled to one vote. For more information, call Carol Cribbs, 488-7070.

Cafeteria menu—Special: chicken fried steak. Entrees: beef pot roast, shrimp chop suey, pork chops. Soup: navy bean. Vegetables: carrots, cabbage, green beans.

March 3

Cafeteria menu—Special: tuna and noodle casserole. Entrees: broiled codfish, fried shrimp, baked ham. Soup: seafood gumbo. Vegetables: corn, turnip greens, stewed tomatoes.

March 11

Lunar pole conference—A Lunar Polar Probe Conference is scheduled for March 11-12 at the Nassau Bay Hilton. The conference is designed to formalize plans for the development, funding and launch of a small satellite to explore the polar regions of the Moon. The conference is sponsored by the National and Houston Space Societies, Milwaukee Lunar Reclamation Society, University Space Society, New Orleans Space Society, Space Studies Institute, Space Frontier Foundation, ETM Inc. and Third Millenium Inc. Speakers will include Dr. Wendell Mendell of JSC. For more information, call 643-6373.

March 13

Lunar conference—The Twentieth Lunar and Planetary Science Conference, sponsored by JSC, the Lunar and Planetary Institute (LPI) and six other professional societies, will be March 13-17 at the Rec Center. Mike Duke, chief of JSC's Solar System Exploration Division, and LPI Director David Black are co-chairmen.

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2.

Property

Sale: University Green patio home, 2 plus study/2/2D, 8' brick privacy fence in front and only five blocks from JSC, Jenn-Aire, fans, wet bar, vaulted ceilings, and low lawn maintenance, more, \$98,000. 488-0397.

Sale: Alvin area, 3-1-1 brown brick house, 25 min. from NASA, well estab. neighborhood, 2 blks. from high school, \$43,000. Kay, x32251 or 331-3379.

Sale: League City, 2.06 acres, city water and sewer avail., near schools, 10 min. to NASA, \$39,950. 554-6695.

Sale/Trade: N.E. Dallas, 4-3-2CP townhome, 2,100 sq. ft., 2 FPL, assum. FHA w/qual., owner will hold 2nd w/10% down. 280-9488.

Lease: Baywind II townhome, 2-2.5, large two-story unit, (approx. 1,130 sq. ft.), FPL, W/D, ceiling fans, pool, tennis, etc., \$490/mo. Jeff, 280-8608.

Sale: Big Bend area hunting land, 160 acres, \$150/acre, OBO. 337-4051.

Rent: League City, 2-1 frame, large lot, huge trees, 10' ceilings w/fans, new paint, new carpet, quiet secure area, 4 mi. to NASA, \$345/mo. Gene, x38020 or 334-1505.

Lease: Friendswood/Sun Meadow, 3-2-2D, \$600/mo., no pets. 996-9157.

Rent: Beach house near Galveston, front row, adjacent to San Luis Pass fishing pier, 2 BR, weekends or weekly. 894-0979.

Lease: Baywind I condo, 1-1, upstairs, refrig., stove, dishwasher, \$260/mo. plus dep. Bill Gordon, x39376 or 487-4537.

Sale: Seabrook waterfront lot, 75' x 150', heavily wooded, all util. avail., \$18,000. 333-5821.

Sale: Friendswood/Sun Meadow Estates, wooded lot in estab. neighborhood, cul-de-sac, bordered by stream and golf course on 2 sides, approx. 245' deep and up to 86' wide, util. on site, \$31,500. Doug, x32860 or 486-7412.

Lease: Texas City Gatsby condo, across from College of the Mainland, FPL, 1 BR, large w/walk-in closet, all appl., \$315/mo. 282-4261 or 554-4974.

Cars & Trucks

'79 Olds Delta 88 A/C, P/S, P/B, orig. owner, good cond., \$1,250. x34557 or 485-1541.

'85 Dodge 3/4 ton maxi-van, Owens classic conversion, dual A/C, 4 captain's chairs, bed, table, CB radio, AM/FM cass., 318 c.i. motor, showroom cond., \$11,300, OBO. 482-6611.

'85 Dodge Omni GLH Turbo, full roll cage, spare roller, eight wheels, fun, fast, less than 1,000 mi. on rebuild, \$4,500, spares nego. x32949.

'87 custom Toyota van, auto, w/over drive, dual A/C, mini blinds, AM/FM cass., ex. cond., will sell for balance due. 333-5821.

'77 Chevy P/U, new batt., new shocks, A/C, P/S, P/B, rebuilt trans., AM/FM stereo/cass., eng. not running, BO. Tim, 280-7537 or 486-5659.

'81 Buick Century Limited 4 dr., V-8, cruise, tilt, P/S, A/C, AM/FM stereo radio, new tires and fuel pump, runs and looks good, \$2,200. John, x36918 or 488-5767.

'86 Chrysler Fifth Avenue, fully equip., AM/FM stereo tape, gunmetal metallic, wire wheel covers, low mi., like new, below NADA, \$9,900. 482-1535.

'79 Dodge 3/4 ton van, silver, customized, maroon int., captain's chairs, bed, table, storage, CB radio, ex. mech. cond., Michelin tires, low mi., \$2,695, OBO. Dean Thompson, 332-2229.

'83 Ford Mustang, V-6, P/S, A/C, cruise, tilt, ex. cond., \$3,800, OBO. 282-3800 or 554-4974.

'80 Chev. Blazer, 4 spd., 4 wheel drive, A/C, mags, Pioneer AM/FM cass., \$3,500. 332-0365 or 282-2802.

'73 Ply Valiant 4 dr., slant 6, auto., A/C, 82K orig. mi., dependable, \$1,500. 332-0365 or 282-2802.

'84 Mazda GLC, 39K mi., A/C, AM/FM cass., 5 spd., ex. cond., \$3,000, OBO. Todd, 282-3475 or 333-2861.

Cycles

'77 Honda 750 w/fairing, CB, and luggage rack, \$600. Tim, 996-9191.

'85 Honda Shadow 500, low mi., w/windshield, ex. cond. x36462 or 996-1410.

Boats & Planes

19.5' Bowrider, Sea Sprite, 1986 model, all options, 140hp Mercruiser I/O, total 25 operating hours, \$8,500, OBO, will consider trade for pool contracting work, 538-3129.

Audiovisual & Computers

Pioneer 35 W/C receiver and Panasonic speakers, \$75; Citizen 120D printer, Epson IBM comp., \$125, OBO. Ken, 282-3468 or 486-7661.

Apple IIe Enhanced, A.E. Ramworks 80 column memory card, 385K RAM, 2 disk drives, parallel printer port, 300 baud modem card, CP/M card, NEC monochrome monitor, system saver with fan, programs, manuals, \$900, OBO. John, 991-3753.

Original Compaq portable, 640K, 1-360K floppy drive, 2-20 MB shock mounted Tandem drives, ports, 2-parallel, 1 serial, 1 game, external color monitor, \$1,500. Craig, 282-3731 or 485-5636.

Apple II+, 64K RAM, NEC color monitor, 1 disk drive, joystick, programs and manuals, \$300, OBO. John, 991-3753.

Philco Model 60B (1933) antique cathedral radio, restored, \$120. 482-5274.

TI portable professional computer, 256K, color, 300/1200 baud modem, software, \$900; TI model 855 printer, \$200. Sarah, x30690 or 486-0244.

Global specialties logic probes, LP-3 35 mhz probe, \$20; DP-1 digital pulser, \$20, and LM-1 monitor clip, \$25. Tom Clark, x39842.

80 character printer stand, table top, three levels - printer on top, incoming paper on bottom, outgoing paper in middle, brand new,

never been used, \$35. Bryan, 282-3277.

Original IBM PC, not a clone, 640K RAM, 20 MB harddisk, serial and parallel port, monochrome, ex. cond. Larry or Kathy, 996-5296.

HP-71B computer/calculator w/soft case and finance module, ex. cond., was \$600, now \$325. Joe, x33281 or 944-6513.

Apple IIc system, monitor, two disc drives, Imagewriter printer, mouse, integrated and financial software, reference manuals and more. McCreary, x34238 or 488-7636.

Household

King size, full motion waterbed w/lighted mirrored headboard, padded siderails, 6 drawer pedestal, heater, liner, and fill/drain hardware. Jerry, x35385 or 480-9711.

Antique hump back steamer trunk, 34L x 21W x 28H, has 95% HDW/trim, \$195; elect. dust collector for furnace, H/P, "Edison", w/pressure switch, 800-1600 CFM, was \$380, now \$150; mirrors, gold-veined (2), 45 x 91 1/2, \$100/ea. Doug, x32860 or 486-7412.

5-pc. bedroom set, 2 end tables, mirror, dresser, king size headboard, particle wood, dark brown, \$300, OBO. Alan, x32554 or 334-5478.

Antique English washstand, marble top, \$70; Bentwood rocker, like new, \$85; dinette table, \$30. 488-6549.

30" round dinette pedestal table and 2 captain's chairs, ex. cond., \$100. John, x38178 or 482-5837.

Assume payments, \$20/mo., Sears Kenmore washer/dryer, heavy duty, 9 1/2 mos. old; daybed, white w/gold trim and access., good quality, was \$460, now \$200. Jackie, x37426 or 484-1761.

Side-by-side refrig./freezer, ex. cond., auto. defrost, \$200. x30720 or 488-4373.

King size bed, mattress, box spring, \$85; two lamps, \$20/ea., child's car seat, \$25; 16" table fan, \$20. Navin, 333-6745 or 482-1660.

Soma double size waterbed, \$150. 282-4596.

Couch w/mirror trim and rust pattern, \$75. Tim, 996-9191.

Large heavy glass table w/4 chairs, \$150. 331-3379.

King size waterbed, heater, less than one yr. old, headboard w/mirror, \$100, OBO. 554-4436.

Wanted

Want VHS recording of "Favorite Son," trade for "War in Remembrance" or "Lonesome Dove." Bob. 282-1969.

Want electronic test equip. including O'scope, function generator and counter. Don, x34510 or 484-2597.

Want large size mission operations patch (9 1/2") "New" design, need at least one, but could use three. Kyle, x38653.

Want to trade \$8,000 electronic organ for land car, truck, or boat of equal value, OBO. 337-4051.

Want sleeper sofa in good cond. for reasonable price. Debbie, 334-1505.

Want economical B&W photo developing services, small batches, some enlarging. Doug, x33344.

Want van pool riders from Sugar Land, West Wood Mall, Loop 610 Park and Ride to JSC area. Kam, 282-5163 or Alice, x35234.

Want wedding dress. Catherine, 326-4402.

Photographic

Canon AE 1 w/flash, 135 mm tele. 28 mm wide angle, 50 mm lenses, tripod and bag, \$225. 488-9034.

Konica FS-1 35mm auto. (AE) camera. Hexanon f-1.4x50mm, Hexanon f-3.5 35-70mm zoom, Tokina f-3.5 28-85mm zoom, flash unit, all cases, UV haze filters, very good cond., \$300. 482-8262.

Konica Autoreflex T camera and lens, \$125, also other Konica lenses. x30577.

Pets & Livestock

Stalls and/or pasture for rent on 15 acres in Dickinson, pasture, partial board, full board. 534-2806 or 333-7098.

Free dogs to good home, rescued from abandonment and nursed back to health, many to choose from. x32949.

Small female dog about 1 yr. old., sweet, shy, free to good home. Julie, x31276.

Musical Instruments

Hammond B-3000 console organ w/Leslie speaker, very good cond., great old time gospel and jazz sound, avail. w/additional rhythm unit, \$4,500. 482-8262.

Tenor sax, good for student, \$200. Robert, x36758 or 922-1517.

Alvarez Yairi 12 string guitar, ex. cond., \$675, OBO. 280-7344 or 488-7227.

Lost & Found

Lost ladies yellow gold 6 diamond ring, size 5, each diamond is the center of a little flower, possibly lost in Bldg. 11 cafeteria between 11:00-11:30 on Monday, 2/6, reward. Jana Thomas, x31653 or 532-3008.

Miscellaneous

Chain saws and log splitter, Stihl 24" 056AV electronic, Stihl 15" 015AV, Sears best log splitter 5hp 24" stroke. Joe Canniff, x33281 or 944-6513.

Used maternity clothing for working professional, sz. 8-10. Patty, x34327 or 538-2107.

Royal elec. typewriter, \$95; pair of beautifully carved large chairs, \$500 for both or will sell separately. 488-5564.

Newly rebuilt '73 Volvo engine, runs very well, \$200. Earlene, x30498 or 331-6947.

Golf clubs, new set, 1 and 3 metal woods, tour model system II irons, 1-9, PW, SW (peripheral weighted) putter, and golf bag, \$300 or parts. David, 554-5514 or 282-3827.

Model 546 Hickok tube tester, good cond., \$40; electron tube tester model TV-7 B/U-w/manuals, good cond., \$40; PRC-74 transceiver 2-12 MHz, solid state, 12 VDC input, mfg Hughes aircraft, \$30. 921-7212.

TEAC 4010S reel-to-reel tape recorder, \$80; Garard turntable w/stylus, \$30; extensive record album collection, BO. 488-6549.

Guy Coheleach raccoon family and koala bear art prints. Linda, x34044 or 280-0909.

Sears electric typewriter, ex. cond., \$65. 332-1272.

Ruger, "Speed-Six", stainless 38 special, snub-nose, Pachmeier grips, \$260; Charter Arms, "Pathfinder", stainless, 22 long rifle, \$195; Glock, Model-17, 9 M/M, seventeen round clip, official side arm of Austrian Army, two clips, \$435; Smith & Wesson, Model-12, snub-nose, 38 special, \$245, all guns brand new in boxes. Charlie, x34071 or 333-4681.

R19 fiberglass insulation, 650 sq. ft., 6' ceiling batts, \$100. Tom, x39042 or 488-5641.

2 Sears prof. tool chests, \$295; 4 ash chairs, \$400; ash rocking chair, \$60; AT&T electronic phone, \$25. x37192 or 996-9724.

Men's 26" bicycle, like new. Kathy, x36462 or 996-1410.

Fence, 4' high x 175' length, encloses 1,500 sq. ft., no rust, 6' posts included, good dog run, \$100, OBO. 554-4436.

Fiberglass hardtop for Jeep CJ5, black w/3 doors, \$300, OBO. Jim, x37491 or 474-3543.

Hunter "original Old Tyme" white 36" ceiling fan, \$35; Western tan cowhide fringe coat, size 40, like new, \$75; computer memory, 4164 DRAMS, \$95 each; Rugcrafters safari jungle scene rug kit, \$30, OBO. 482-5274.

Marmink fur stroller, dark brown, \$350; tall table lamp, \$25; wood fern stand, \$15; 1879 Gilbert antique clock, \$175. 488-5564.

Bentley Super-8 camera and player, \$75, OBO; audio-technica photo cartridge, new, \$25. Sarah, x30690 or 486-0244.

B&K isolation transformer #TR110, never used, \$60. Tom Clark, x39842.

Flying simulator time, 5 hours, \$100. Tim, 996-9191.

Everything needed for 200 Amp. meter loop except breaker box, \$50; two new complete wind-turbine-vents, \$10/ea. Fred, 333-2166.

Colonial sofa, loveseat, rocker, ottoman, 2 tables and 2 lamps, \$275, OBO; rowing machine by Vitamaster, \$50. 282-2569.

Various video movies/audio cass., ex. cond., \$10/ea. for movies or \$3/ea. for cass. Linda, x34044 or 280-0909.



JSC Photos by Benny Benavides

JSC's Correspondence Section, part of Center Operations' Management Services Division, answers part of the center's public mail. From left are Betty Kendrick, Section Chief Doris Grosshauser, and Chester Jenkins.

Letters, letters

Correspondents try to answer every letter NASA fans send

(Continued from Page 1)

agency that fires the imagination and an institution intimately connected with the future.

As for foreign mail, many things easily taken for granted in the United States are only imagination to those in other countries. "They look up to us as a major country, and we've wanted something that shows what a Shuttle looks like or what the Moon really looks like. Just the other day, one little boy from South America wrote that he got tears in his eyes every time he saw a Shuttle launch."

Foreign letters often come in broken English or a foreign language. Sometimes they are scribbled on scrap paper and use old newspaper as an envelope. All are read. And all, be they foreign or domestic, are answered—even if they must be translated.

In the Correspondence Section, Chester Jenkins has opened and sorted fan mail for more than two years. "When you write to someone, you're always expecting a response," Jenkins said. "It's a never ending job."

Answering the letters falls to the various areas in charge. The strangest letters and the most difficult requests fall to the NASA Information Services Unit in the Public Services Branch. Correspondence Clerk Patsy Rogers, who's been responding to hundreds of letters a week for seven years, and other workers in the unit have seen it all.

By far, the average letter is from a child who wants information for school work or just for fun, Rogers said. Pencil sketches, at times in living crayon color, are common gifts to NASA. In response, children and students are sent information sheets, activity books and photographs.

A large amount of letters come from adults, too. They may offer theories and suggestions, complete with tediously detailed blueprints. They ask questions about everything.

"They think that anything to do with space is NASA, and they think, really, that we know everything," said Barbara Ewing, supervisor of the information unit. "They're really surprised if we don't have an answer."

Five people handle the mail in information services. In a single month, they may respond to as many as 5,000 letters. In addition, packages occasionally are received.

A jeweler from Italy once sent a Sterling silver Space Shuttle, Rogers said. People sometimes send in interesting rocks or deposits they've found. A New York woman recently sent a stunning STS-26 launch photograph she took from the window of a commercial airliner. She donated the picture to NASA to be used at the agency's discretion.

One of the most remarkable facts about the constant flow of incoming mail is that, as a rule, it is overwhelmingly positive. "In two and a half years, I'd say we've had maybe five letters that I'd call hate mail," Ewing said. "There may be people who are critical of NASA, but they're only that way because they care about the program."

Still, in every box of mail "there are

one or two crazies," Rogers added. NASA attracts the unusual: detailed accounts of UFO visits; predictions of the world's end; visions of outer space; blueprints of how to build a starship.

Fan letters to astronauts are profuse among JSC's mail, and they end up in the Astronaut Office Mailroom. "A lot of the letters are from children, I'd say probably a majority," said Mary Lee Meider, mailroom and special activities manager. "But we get a lot from adults, too."

By far the most common request is for a crew photograph, and the astronaut mailroom's three-person staff will answer those requests. Individual astronauts, however, usually answer their own mail, Meider said. In all cases, every letter received is answered.

"These people are real heroes to an awful lot of people of all ages," said Meider, who has worked with astronaut mail for seven years.

"I think it's just that these people are very enthusiastic about the space program; children always say they're going to be astronauts, and they ask for information on how to do that," she added. "Working with these letters gives you a good feeling that you're helping someone along the way, and you're helping them to understand the space program a little better."

Letters to crews assigned to the upcoming mission always increase, Meider said, but the mail prior to STS-26 was exceptional. Before the return to flight, letters increased by almost 3,000 per month. Still, all were answered.

"It's a lot of work," Meider said. "But it's worth it."

'Dear NASA' letters contain thanks, heartwarming stories

[Editor's note: Here are just a few examples of the millions of letters JSC receives from the public each year. The text is reprinted verbatim, with misspellings.]

Dear N.A.S.A.

I would like to thank you on behalf of our son Norman. Norman as since died with muscular dystrophy.

But while he lived you gave him a lot of pleasure and joy. When he sent for photographs he got them. When he wanted information on the space missions he got it. He loved the space programme. Of by heart he would tell you all the missions that went into space. He

would tell you the names of the astronauts of each mission. We have still got all the photographs you sent him in albums. We have just got them back after lending them to a friend. We had planned to visit the space centre. But this now cannot be. We watched the space shuttle discovery lift into space

on our T.V. in our home in England. I said to my wife when watching the lift off. Our son would have been very proud and overjoyed. Then what my wife said to me while we watched the lift off brought a lump to my throat. She said our son Norman is with them.

Thank you all again at N.A.S.A. for all the joy and pleasure you gave our son.

God bless you all.
And a Merry Xmas.
And a Happy New Year.
Mr. John Gibson
Gilesgate
Durham, England

Dear N.A.S.A.:
You did a good job. I like watching it because I didn't have to read.
Sincerely,
Jermaine

Dear NASA
I heard about the space junk on the news. I have an idea to get it. Send two Space Shuttles with one net. Attach one side

of the net to one Space Shuttle and the other side to the next. Chath the junk in the net.

Eric Neumeyer
Dartmouth, Nova Scotia, Canada

Dear Sirs:
I am writing for some information about the qualifications to become an astronaut. You see, I have flat feet and so does my father. He was kept from war because of it. The question is: would I be able to become an astronaut, even with my flat feet? That should be the only thing standing in my way, at least, that I know of. I am currently enrolled in Air Force Junior Reserved Officers Training Corps (AFJROTC) at Edmond North Mid-High. If flat feet will keep me from being an astro-

naut, then I don't want to be in that class.

By the way, I had this idea for ariel camouflage. Why don't you put either heat reacting or light reacting material on the plane to camouflage it better? It could turn a certain color when certain amounts of heat or light hit it. That way, when you are below it, it blends more into the sky, and when you are above it, it blends into the ground more. Just thought that it might help.

Sincerely,
Matthew Primm

Dear Research Person,

I am in the eighth grade and would like to do a science project for our school fair on the following question: "Does sound take up space?" Can you tell me whether or not any

research has ever been done on that question? If so, would you be able to share that information with me?

Also, do you have any ideas as to what kinds of experiments could be conducted by me in order to answer that question: The only suggestion my science teacher had

was to blow up a balloon, turn up the stereo way up, and see if the balloon pops. Needless to say, my speakers blew out, my balloon didn't pop; and that was the end of that experiment.

Any research you can share on that question: "Does sound take up space?" would be very much appreciated.

Sincerely,
Darren Stueber

Eight grade student

Dear N.A.S.A.,
Thankyou for the realy nice pictures. I realy enjoy them they were exalent. I'm going to put them up in my room to look at. I bet whoever takes the time to read all these letters thinks doing this for people is good.

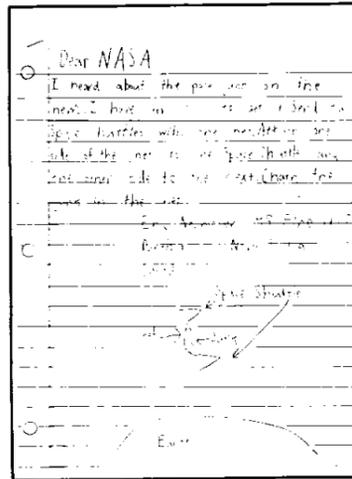
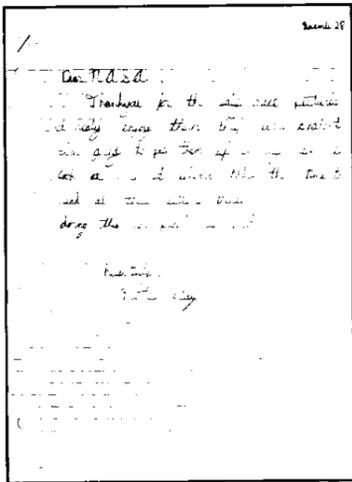
Respectfully,
Matthew Clay

Santa Claus
Santa's Village
North pole
Dear Santa,
We think you should trade your sleigh in for a shuttle. A shuttle is better because it's much faster. You will finish earlier because it only takes 90 minutes to orbit the Earth (and you can go home and have a party with Rudolph

and the elves. The reindeer would not have to work so hard and you won't have to clean up after them. You would have more room because you could put you presents in the cargo bay. You could use the Robotic Arm to drop presents down the chimney. If you need to get out of the shuttle, it would be easy because you could wear a SMU (Santa Manevering Unit).

You could relax because Mission Control could do all the work. You could also deliver presents to the Aliens! We hope you consider our request.

Love,
The second Grade
St. Felistiss School
San Marino, CA



The tough letters are sent to the NASA Information Services Unit in the Public Affairs' Public Services Branch. From left are supervisor Barbara Ewing, Anjali Jagtap, Amy Dugi, B.J. Tomaro, Patsy Rogers, Tom Holladay and Gloria Sanchez.

Debris study stresses need to know more

(Continued from Page 1)
current observation methods.

An estimated 7,059 trackable objects are in orbit around the Earth, the report states. Of that number, 1,695 are active and inactive spacecraft, 1,076 are spent rocket bodies and 4,288 are fragments and other debris.

The report estimates that the number of trackable objects represents only about 0.2 percent of the orbital debris population. The estimated mass of man-made objects in various orbits is about 6.6 million pounds.

Uncertainty as to exactly how much debris is in orbit makes it difficult to assess the true risk posed to spacecraft, the report states, and that in turn creates uncertainty as to the urgency for action and the potential effectiveness of any corrective action.

NASA's Jet Propulsion Laboratory

recently issued a request for proposals from industry based on JSC's specifications for a ground-based radar to detect orbital debris particles as small as 1 centimeter in diameter at an altitude of 500 Kilometers. The U.S. Space Command today tracks objects only as small as 10 centimeters in diameter.

The report also details the effects of collisions that occur at the extremely high speeds these objects are traveling, called hypervelocity. In low-Earth orbit (LEO), debris circles the globe at 7 kilometers per second. When these objects collide with each other or with operational spacecraft at a combined velocity of 10 kilometers per second, the results can be serious or catastrophic, the report states.

For example, a 0.3-centimeter object traveling at 10 kilometers per second

has the destructive power of a bowling ball traveling at 60 miles an hour, the report states. Or a 1-centimeter aluminum sphere traveling at 10 kilometers per second has the destructive power of a 400-pound safe traveling at 60 miles an hour.

The study group recommends that the NASA-DOD team develop a comprehensive research and development plan to improve orbital debris monitoring, modeling and data management capabilities. It also recommends that NASA and DOD, in consultation with DOT and the private sector, develop a basic research plan for generic technologies and procedures for minimizing debris and protecting spacecraft. Both plans are requested by Jan. 1, 1990.

JSC is expected to have a major role in the continuing study of orbital

debris and hypervelocity impact, Loftus said, but that role has not yet been defined. "We're still in the process of trying to digest it (the report)," Loftus said.

"What started out 15 years ago as being an interesting speculation by a young man has risen to be a national policy issue," Loftus said. "I think the efforts that we JSC and the Space Command have been engaged in for the last 15 years are the bible. That's the information that's used by everybody."

Don Kessler, the man Loftus referred to, said he feels the report is a fair treatment of the issues.

"It pretty much underlines the conclusions we had reached before, mainly that there's a lot that's not known and needs to be known about orbital debris," Kessler said.

Kessler said he was glad the report discussed the dire consequences of unchecked orbital debris growth. Unless the amount of debris created in orbit is constrained, the report states, a "critical density" could be reached by the mid-21st Century. Critical density is the point at which the number of objects in orbit is so large that an increasing number of collisions creates a runaway increase that renders some altitudes unusable.

"It's something that needs to be looked into in more detail," Kessler said. "You don't want to be wrong one way or the other. If you're wrong about the possibility of losing low-Earth orbit, then you've done a lot of work toward nothing trying to save it, but if you don't take it seriously you may end up losing LEO."

STS-29 pad work continues

(Continued from Page 1)

nance. Monday, hydraulic cycling of *Discovery's* aerodynamic surfaces will verify they are in good working condition.

The primary payload for STS-29 is Tracking and Data Relay Satellite-D (TDRS-D). It will be boosted into geosynchronous orbit by an inertial upper stage (IUS). IUS computer software installation was expected to have been completed by Thursday, and will be followed by IUS flight readiness checks.

Batteries for both the TDRS-D and IUS were powered up last weekend to protect a possible launch between March 9-23. IUS battery installation is planned for Monday.

STS-29 crew members Mike Coats, John Blaha, Jim Buchli, Bob Springer and Jim Bagian, along with flight controllers in the Mission Control Center, will take part in a long payload deploy simulation from 8 a.m. to 11 p.m. Tuesday.

Preparations for the next Shuttle mission, STS-30, continue to proceed smoothly with *Atlantis* scheduled to move from the Orbiter Processing Facility to the Vehicle Assembly Building (VAB) on March 9. Later that same day the Orbiter will be mated to its external tank/solid rocket booster stack.

While in the VAB, work will begin on changing out *Atlantis's* oxidizer turbo-pumps in the same manner as those on *Discovery*. Depending on the STS-29 launch date, the pump changeout on *Atlantis's* main engines could be completed at the launch pad.

Tires were installed on *Atlantis* last weekend as were the crew seats. The location of the seats will allow more room and greater reach for the crew while in their new launch and entry suits.

Launch of *Discovery* on STS-29 around March 10 would permit transfer of the Magellan/IUS to the launch pad about a week later with roll out of the STS-30 stack to the pad a week later than that.

German engineers participate in space radar testing at JSC

By Linda Copley

The first round of testing for STS-55's Space Radar Laboratory (SRL) payload, scheduled to fly on *Discovery* in May 1992, was completed last week in JSC's Electronic Systems Test Lab (ESTL).

Twenty project managers and engineers from participating organizations: NASA's Jet Propulsion Laboratory (JPL), the Applied Physics Lab (APL) at Johns Hopkins University, Rockwell International, Downey and DFVLR, the West German space agency, participated in tests between the Orbiter communications systems and the Tracking and Data Relay Satellite (TDRS) network systems.

The recent tests transmitted a signal from Bldg. 44's ESTL to TDRS East and relayed it to the White Sands

Ground Terminal, where the information was routed through a domestic satellite to the Mission Control Center (MCC) in Bldg. 30. From the MCC, the data was routed back to the ESTL by fiber optic cable.

"The SRL subsystem provided by JPL, APL and the German space agency was integrated for the first time in the ESTL," said Bobby K. Vermillion, head of the Communications Evaluation Section. "They will return three to six months before the mission for more tests."

The Space Radar Laboratory payload will carry a modified version of the Shuttle Imaging Radar, the German X-band Radar, and the Measurement of Air Pollution from Satellites (MAPS) instruments on three planned Shuttle missions beginning in 1992.



The refurbished fuselage of a T-38 turned heads Tuesday morning at JSC's Shipping and Receiving Warehouse, Bldg. 420. Robert L. Martin, traffic management specialist, inspects the 46-foot-long "receivable" before sending it on to Ellington Field.

T-38 going back on flight line

Work continues on aircraft rescued from ground training duty

By Linda Copley

A 1960-model T-38 fuselage arrived at JSC this week, turning the heads of employees coming to work Tuesday through the center's back gate.

The 28-year-old aircraft, fresh from a five month makeover at Randolph AFB in San Antonio, originally was discovered in non-flyable condition at New Mexico's Holloman AFB. The plane will undergo another four months of repairs and updating at Ellington Field before its transformation into NASA 915 is complete.

"We were actively looking for T-38's to add to the JSC fleet," Ken Cockrell, T-38 project pilot, said. "We had 26 planes at the time and 28 was our optimum number to adequately support our flight schedule."

"We noticed this plane while out at Holloman being used as a ground trainer. In other words, maintenance people would install and remove parts from the craft and learn to

operate the systems as part of their training, but the plane never left the ground. In fact, it had not actually flown since the mid-'70s.

"This was the first time we had ever refurbished a plane from a non-flyable condition," Cockrell said. "But it looked in pretty good shape, so I wrote a letter to the Air Force asking for the plane. Apparently they had not chosen to keep it in the air because they did not need another T-38 in their fleet at the time and had not chosen to bear the expense needed to keep it in flying condition. Within a few months of receiving the letter, the Air Force transferred the plane to us. We then shipped the entire aircraft to San Antonio aboard the Super Guppy."

Once at Randolph, Lear Siegler Services Co. was contracted to do the initial repair work. All removable parts were taken out to check for and correct corrosion problems and technical changes that brought the

aircraft up to current day standards were made.

"Unlike automobiles, our planes are constantly updated by making technical changes to the existing aircraft, rather than just buying a new plane. These changes are called Time Compliance Technical Orders (TCTO), and we are up in the 600 numbers for our current fleet of T-38's," Cockrell explained. This 'new' addition had not received a TCTO in over 15 years, so we have a lot of catching up to do."

The 46-foot-long fuselage is currently up on jacks in Bldg. 276 at Ellington, where a new wing will be attached, giving it a 25-foot wingspan. This and all additional NASA modifications will be made by the Northrop Worldwide Aircraft Services maintenance contractor.

"The plane should be in the air sometime this summer," Cockrell said. "And in the meantime, we're still on the lookout for another T-38."



West German engineers Rolf Werninghaus, Herbert Holzi, Jurgen Koyro, Martin Simon and Reiner Schmidt test Space Radar Lab equipment in JSC's Bldg. 44 Electronic Systems Test Lab.

Awareness can reduce slips, trips

The early February Arctic cold front created many unusual, hazardous conditions at JSC, according to JSC's Test Operations and Institutional Safety Branch.

Bob Brennecke and Dan Bissonnet of safety support contractor Webb, Murray and Associates, said frozen water pipes, slick road conditions, and slippery sidewalks were common. From Feb. 6-8, JSC civil service and contractor employees reported 32 mishaps related to falls on icy sidewalks; 25 resulted in injuries.

Slipping and tripping hazards in the workplace may seem almost trivial compared to such things as electric shocks or exposure to toxic chemicals, but slip and trip mishaps are a leading cause of injuries in the workplace—second only to moving or lifting objects improperly. They cause between 1,200 and 1,600 deaths in the United States each year.

At JSC, such falls are the leading cause of mishaps, Brennecke and Bissonnet said. In 1988, there were 98 injuries due to slips, trips and falls. Employees involved in 27 of those accidents missed at least one day of work, accounting for 18 percent of all 1988 JSC "lost time" injuries.

There are two major causes of slip and fall mishaps, the pair said. The first is the condition of the walking surface. Is it wet? Is it slippery? Is it uneven? Are there holes to step in or objects to trip over? The second cause is related to the care workers show for the environment. Do they wear slick or muddy shoes? Are they running or inattentive?

Brennecke and Bissonnet said there are several actions workers can take to help prevent falling or slipping:

- Floors, stairs and ladders should be kept as clean and dry as possible at all times. Minor spills such as water, coffee or oil should be cleaned up or barricaded immediately.

- Warped floors, missing tiles, curled or raised edges on mats or rugs, potholes in parking lots and walkways, poor lighting in stairwells and landings, slippery ramps or poorly marked changes in floor levels should be reported to a safety representative.

- Shoes should be kept clean and free of mud, oil, nails and other foreign objects. Badly worn heels or cleats increase the chances of slipping or tripping. High heels also contribute to falling injuries.

- Avoid running or hurrying, especially on slick surfaces. Keep at least one foot on the floor when sitting in a chair—falling over backwards has caused at least 10 injuries at JSC over the past three years.

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